American Electro-platers' Society

(An Educational Society)

Chartered 1909

MONTHLY REVIEW

JUNE, 1915

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MONTHLY REVIEW

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I shall pass through this world but once. Any good thing, therefore, that I can do, or any kindness that I can show to any human being, let me do it now. Let me neither defer nor neglect it, for I shall not pass this way again.—*Amiel.*

MONTHLY REVIEW

American Electro-platers' Society

(An Educational Society)

V. 2 JUNE, 1915 No. 1.

Editorial

The "Review" for the next thirteen months will be just exactly what the members make it.

COMMERCIAL ASPECTS OF ELECTRO PLATING WITH COBALT—HISTORY

By W. S. Barrows.

To follow the history of the mineral Cobalt through the centuries which have passed since Cobalt Oxide was first used by the ancient Egyptians thousands of years ago, for the purpose of imparting a blue color to glass, would not be particularly interesting to those present. The cobalt oxide industry is a very old one. It probably started on what might be considered a commercial scale, at Schneeberg, Germany, in 1520. Smalt containing 6% of cobalt was then sold at Venice. The smalt industry spread into Saxony and Bohemia and during the sixteenth and eighteenth centuries grew very rapidly.

During later years, up to 1904-5, New Caledonia, New South Wales, Chili, Spain, Norway and Prussia supplied the world with cobalt. The output of the New Caledonia mines at the time the Ontario deposits were discovered, was probably 85-90% of the world's supply.

The silver cobalt mines of Ontario began to produce in 1904, and since that time they have wrested the monopoly in the production of cobalt from New Caledonia until the past year about one-half the ore from the Cobalt camp found its way to United States smelters. The ore is silicious and mixes well with United States basic ores. We do not believe that the cobalt content of the ore shipped to the United States has ever been recovered to any extent. The present United States practice leaves it in the form of residues containing lead, copper, arsenic, antimony, sulphur, nickel, iron, silver and gold, that is, in a rather bad shape to be treated for cobalt.

Until the past year or so, practically the only way which cobalt found its way into the industries was as cobalt oxide Co_3O_4, for use as blue coloring substance, and the production of cobalt from the Ontario mines has much exceeded the consumption of cobalt oxide.

In a letter dated March 13, 1915, Dr. Haanel, director of mines, Ottawa, informed me that no metallic cobalt is at present manufactured, but the production of cobalt oxide during the year 1914 was 890,789 pounds, valued at $569,516. The production has been sufficient to cause a falling off in the price of cobalt oxide from $2.50 per pound in 1907 to less than one dollar a pound in 1912.

What Is Cobalt?

Cobalt is a silver-white metal with a faint suggestion of pink. It is tenacious. It can be readily polished and it exhibits a high lustre. It may be considered as a sister to nickel and a cousin

to iron; like iron, for example, it is magnetic. However, it should be remembered that it is not nickel and it is not iron, but that as an elemental substance it possesses properties that differentiate it from every other substance on earth. Having unique properties, it ought to possess unique utilities, and common experience tells us that these unique utilities have only to be sought to be found. Pure cobalt has a specific gravity of 8.8.

Hardness tests were made in the laboratory at Kingston, on a standard Olsen hardness testing machine of 100,000 pounds capacity. All hardness measurements of the metal cobalt were computed by the Brinell system. The Brinell hardness numeral being dependent upon the size of the sphere used to make the indentation, and upon the pressure subjected, it is necessary to consider these with each measurement.

All hardness measurements of the metal cobalt at Kingston were made with a sphere of one centimeter diameter, and with a load of 3,500 pounds, unless otherwise stated. A table giving a rough basis of comparison of the Brinell hardness of a series of common substances is as follows:

Material.	Load.	Brinell Hardness.
Copper, rolled sheet, unannealed	3500 lbs.	81.9
Swedish iron	3500 lbs.	75.2
Wrought iron	3500 lbs.	92.0
Cast iron	3500 lbs.	97.8
Tool steel	3500 lbs.	130.2
Spring steel	3500 lbs.	160.3

The hardness of cobalt, like that of most other metals, is determined to a greater extent by its physical and mechanical treatment than by slight variations in its chemical composition, if we except perhaps the presence of carbon.

The total impurities in any one sample of the commercial cobalt rarely exceeded 1.5%.

The experiments at Kingston show the Brinell hardness of cobalt cast from just above the smelting point, and allowed to cool in an iron mold, to be in the neighborhood of 124.0 (load 3500 lbs.). This is the mean of nine observations with an average deviation from the mean of 7.9.

The hardness of nickel of both cast and sheet, under the same conditions as used for cobalt were to be respectively 83.1 and 85.1 Brinell, the latter for $\frac{1}{4}''$ sheet. An independent check test on the hardness of cast nickel, gave as a result 76.4. From these measurements it is therefore apparent that the hardness of cobalt is considerably greater than that of either iron or nickel, under corresponding conditions.

Ductility.

Pure metallic cobalt may be machined in the lathe, although

it is somewhat brittle, and yields a short chip. Small amounts of carbon render it less brittle, with a longer curling chip upon turning. Cast cobalt of extreme purity is not ductile, except when from .1% to .25% of metallic magnesium is added to the metal just before pouring it. But commercial cobalt containing small percentages of carbon may be drawn down to fine wires of any diameter. This gives a malleable metal.

Tensile Strength.

The tensile strength of pure cobalt, cast and unannealed, is in the neighborhood of 34,000 lbs. per square inch. Annealing slightly increases the tensile strength, although not to a marked degree. The tensile breaking strength of commercial cobalt is approximately 61,000 lbs. per square inch.

Compressive Strength.

The compressive strength of pure cobalt, cast and unannealed, is in the neighborhood of 122,000 lbs. per square inch. Annealing pure cast cobalt has a tendency to lower the compressive strength. The addition of carbon causes the compressive breaking strength of cobalt to rise above 175,000 pounds per square inch.

Melting Temperature.

The melting temperature of cobalt 99.9 per cent. pure, is about 1,480 degrees centigrade, while the melting point of nickel is between 1,450 and 1,460 degrees centigrade.

Use of Cobalt.

The element cobalt has several uses in the industries, as oxide, smalt, and as catalyzor.

Metallic cobalt is prepared from the oxide by reduction by

Hydrogen
Carbon Monoxide
Carbon
Aluminum

and is used commercially in various alloys, such as Haynes' Stellite, Becker's steel, American steel companies tool steels, cobalt tin alloys, and for electro plating in England.

Kingston Laboratory.

The purpose of the Research Laboratories of Electro-Chemistry and Metallurgy at Kingston, Ontario, is to conduct researches for the mines branch of the Canada department of mines, investigate the industrial uses of various minerals and natural products of the dominion. About three years ago the present investigation of the metal cobalt and its alloys began under the

direction of Dr. Herbert T. Kalmus, B.S., Ph.D.

After a correspondence extending over a period of nearly two years, Dr. Kalmus made known to me the results of some very interesting experiments made with cobalt plating solutions, and requested me to test the two most important baths, on a commercial scale, thus confirming or upsetting the claims made by the investigators.

Cast anodes, 98.75 cobalt, together with the required quantities of cobalt salts were delivered to me from the laboratories and the remainder of this paper is a condensed account of the tests made under same conditions as exist in the plating department of the Russell Motor Car Co., Toronto, for the electroplating of various metals.

About sixteen different types of solutions were studied at the laboratories. I will, however, confine my remarks to solution known as I B, and solution XIII B.

Solution I B consists of simple cobalt-ammonium sulphate. No reagent was added to this solution after it was made up to maintain its neutral reaction or for other purposes.

The formula is 200 grams of $CO\ SO_4\ (NH_4)\ 2\ SO_4, 6H_2O$ to litre of water, which is equivalent to 145 grams $CO\ SO_4\ (NH_2)\ SO_4$ to the litre of water, or in other words, approximately 2 pounds of cobalt-ammonium sulphate per gallon of water, forming a nearly saturated solution. The simplicity of this bath is worthy of consideration. It is entirely free from additions of any kind and its concentration in metallic cobalt is approximately 3.0%.

Comparing this with the double nickel salt solution which usually contains about 1.5% metallic nickel, or some of the best so-called rapid plating nickel solutions, which contain approximately 2.60% metallic nickel, we would naturally expect very rapid plating from the cobalt bath mentioned, but the figures do not account for the differences in the solution. This cobalt-ammonium sulphate bath proved to be a very satisfactory bath to operate for a great variety of purposes. It requires but little aging before reaching its limit of efficiency and is practically self-sustaining. It remains neutral even after very severe use. The anodes dissolve readily and the solution maintains a uniform density, constant through prolonged operations. Current efficiency tests show an average current efficiency of 98.0%.

The specific electrical conductivity of this cobalt-ammonium sulphate solution is very much higher than that of the corresponding nickel solution, and yields satisfactory cobalt deposits at all current densities up to 37.2 amperes per square foot. Moreover, this solution may be used for plating on the usual surfaces including brass, iron and steel, without any preliminary coating of copper, or unusual preparation of the cathode. The solution may be used with a large proportion of rolled anodes without becoming acid or depleted in metal. Constant use for long per-

iods does not appreciably alter the cobalt content or acidity of this solution if operated at high current densities mentioned.

The solution should be operated neutral, the plates being white, hard, smooth, firm, adherent, yet are easily colored to an excellent finish.

When run alkaline, this solution yields plates which are gray in color, which peel, pit and blister. When operated acid this solution yields fairly adherent, smooth hard plates, but dark and freakish.

The throwing power of this solution I B is remarkably satisfactory. The anodes remain free from coatings such as characterize nickel anodes.

We know of no nickel bath operating in usual commercial plating procedure at anything like as high a current density as this cobalt bath I B.

The allowable current density with which smooth, white, hard, perfect plates may be obtained with this solution, is four times that permissible with the fastest commercial nickel solutions. We have obtained splendid plates from this simple cobalt bath with current densities ranging from 32 to 48 amperes per square foot, the cathode remaining perfectly motionless in the solution. With cathode slightly agitated, current densities as high as 58 and 60 amperes per square foot were obtained, each and every plate thus obtained being easily reproducable under same practical conditions.

I believe you will all agree that the solution described possesses several very remarkable features which could be utilized to good advantage for a great variety of purposes.

I now wish to mention a cobalt bath which not only surpasses bath I B, but which possesses valuable characteristics heretofore regarded as totally beyond practical consideration.

Cobalt Bath XIII B.

Formula:

Cobalt sulphate	4½ pounds
Sodium chloride	2½ oz.
Boric acid	5 oz.
Water	5½ pints

Total bath approximates 1 gal.

The quantities as given by Dr. Kalmes and his associates are:

Crystals cobalt sulphate	566.0 grams
Sodium chloride	19.6 grams
Boric acid	nearly to saturate
Water	100 c.c.

Total bath approximately 1½ litres.

To prepare the bath it is advisable to proceed as follows:

Dissolve the boric acid in the water, by boiling. Transfer this boric acid solution to the plating tank and add the sodium chloride, stir well; when the sodium chloride is dissolved, add

the cobalt sulphate crystals, no further heating being required. The bath may be operated as soon as prepared. If through miscalculation an excess of boric acid is present, this should be removed by filtering, after which no changes or alterations are necessary.

To obtain satisfactory results from this solution, the cathode must be perfectly clean, and deposition effected with the extremely high current densities recommended.

Brass, copper, iron, steel, tin Britania metal, etc., may be treated in practically the same manner as is usual in ordinary nickel plating practice.

For ordinary commercial plating, on wares not subjected to unusual friction or exposure to atmospheric influences, the time required to obtain a durable and satisfactory deposit does not exceed three minutes for iron or steel and from one to two minutes on brass or copper.

With current densities ranging from 60 amperes per square foot to 246 amperes per square foot, we obtained beautiful, hard, adherent plates of splendid color. These plates buffed very easily, the matte being exceptionally fine and velvety. Notwithstanding the fact that a satisfactory color was obtained very easily, these same plates were not cut through by very severe buffing on large buffs operated at high speed. Owing to the extreme hardness of these plates a comparatively thin deposit is sufficient for all ordinary purposes. With a current density of 157 amperes per square foot, a three-minute deposit upon plain surfaces will color beautifully on a 6-inch buff operated at 1,500 R.P.M. with no danger of exposing the base. Embossed brass parts, such as name plates were plated in one minute with a current density of 180 amperes per square foot. These plates were thin buffed upon a 10-inch cotton buff revolving at 3,600 R. P. M. and from a total of 500 pieces, three were rejected after a very careful inspection. The man who buffed these plates was not aware of the test, and is accustomed to buffing 1¼-hour nickel deposit upon the same piece. Often 5% of the nickel-plated pieces are rejected on account of exposed brass on the raised portion.

Brass castings which we ordinarily plate for 1½ hour in the double sulphate nickel solution, were equally as well finished in cobalt in five minutes.

Castings which we plated for one hour in double sulphate nickel solution at usual current density were stripped in the muriatic acid strip solution, consisting of equal parts muriatic acid and water, using lead cathodes and a current of 200 amperes at 10 volts, time required, 30 seconds, while 45 seconds were required to remove cobalt plates obtained in three minutes.

Tests covering a great variety of metals and designs were conducted by bending, hammering, twisting and drawing. In every cast the cobalt deposits proved to equal to the test im-

posed. Current densities were employed to facilitate the production of the required property in the deposit.

By heating this XIII B solution to a temperature in the neighborhood of 100 degrees Fahr. current densities ranging from 350 amperes per square foot to 780 amperes per square foot were employed in the production of perfect plates. The small spoon displayed upon the shield is a sample of this work done in 30 seconds, and the bowl buffed on a 6-inch cotton buff section, revolving 2,700 R.P.M.

Highly tempered chrome nickel steel skate blades were plated two minutes, and subjected to the same buffing treatment as a one-hour nickel deposit. The result was as shown by the sample upon the display shield. Skates of this type were plated with cobalt for two or three minutes, and buffed as is usual for nickel plate, then placed at the disposal of uninterested persons who used them in hockey matches, pleasure skating and speed tests. At the close of the skating season, and after several months' severe use these skates were called in and the skate here shown is a sample picked at random from the lot. It is in no respect a choice specimen. Every skate returned was in as good condition. You will observe there are no cuts, or scratches, neither has the deposit proven defective. This particular blade was sharpened seven times during the winter, this treatment being a part of the test, though not required by the steel. The cobalt deposit is direct upon the steel. Plates of five minutes duration were no better at the expiration of the test, neither were they defective.

On sand blasted surfaces a two or three minute deposit appears slightly darker than nickel, but by simply applying a little pumice, by means of a revolving tampico brush, a very satisfactory matte finish may be obtained, a sample of which is shown on the inside of the electric light shade and upon the iron stove casting.

The Solution.

Bath XIII B when properly prepared has a specific gravity of 1.25 at 15 degrees centigrade.

The electrical conductivity of these solutions is considerably higher than that of the standard commercial plating solutions, so that other things being equal, they may be operated at a lower voltage for a given speed of plating. Bath I B is capable of plating at a speed at least four times that of the fastest commercial nickel solution we have any knowledge of.

Bath XII B is capable of plating at a speed at least fifteen times that of the fastest nickel solution we have any knowledge of.

Both solutions have very satisfactory "throwing" powers. The above mentioned speed has reference to still solution, no

agitation being required.

By agitation the aforesaid current densities may be doubled and in certain cases still higher current densities are allowable. Hot solutions operated by agitation permit current densities approaching 1000 amperes per square foot to be used. These remarks relative to current densities have reference to the production of perfect plates. The baths do not become foul with precipitated matter, creeping salts are entirely foreign to these baths.

The anodes dissolve very readily. The greater solution tension of cobalt in the plating baths, as compared with nickel, renders practicable the use of a lesser amount of iron, or no iron at all.

The solutions are practically self-sustaining. We have tested these solutions almost weekly and they re nain practically constant in their composition, specific gravity, acidity, etc. We have kept the baths at their original volume by addition of water from time to time, no other additions have been made, and the baths were as efficient yesterday as they were one week after their preparation.

Cobalt deposited at the speeds given is extremely hard. We have repeatedly made tests hich prove this point beyond a doubt much harder than electro-deposited nickel, consequently a lesser weight of cobalt will prove as effective and satisfactory as an ornamental or as a protective coating as a greater weight of nickel. A deposit obtained in one minute theoretically equals a 4 minute or 15 minute deposit of nickel from a rapid solution. But when these cobalt plates are given practical tests, to determine their commercial value we find that a 3 minute deposit of cobalt colors easier, has a greater depth of color, and resists identically the same treatment in buffing as is required to color a 1 hour nickel deposit.

Operating cobalt bath XIII B at 150 amperes per square foot, a 1 minute deposit would, therefore, be approximately one-quarter the weight of a 1 hour nickel deposit obtained at 10 amperes per square foot.

If nickel costs you 50 cents per pound in the anode form and cobalt costs you $1.50 per pound in the same form, cobalt would prove cheaper metal for electro-plating purposes.

A 200-gallon bath of nickel will accommodate approximately 36 square feet of work, which may be plated commercially with 360 amperes of current, at a tension of 3 to 3½ volts. Duration of plating under these conditions varies from 15 minutes to 1 hour. On very thin cathodes the latter is often distorted.

Fill this bath with cobalt solution XIII B.

Thirty-six square feet of work at 150 amperes per square foot totals 5,400 amperes, at a tension of from 4 to 6 volts.

Duration of run, 2 minutes.

If you have a dynamo of sufficient capacity, this one bath will give you an output in one hour equal to thirty hours from the

nickel solution, or for a heavier cobalt deposit, say, of 3 minutes' duration, the cobalt bath output for one hour equals twenty hours' production from the nickel bath.

These figures, however, are not practical under existing circumstances. The process of cleaning and preparing the cathode would necessitate diminishing the actual cathode surface in the bath, but, however you may consider the proposition, the necessary floor space for a given amount of work would be exceedingly small compared with present requirements for nickel plating.

Bath I B could be operated easily as a still solution.

Bath XIII B affords unequaled opportunities for the operation of very rapid mechanical devices, both for cleaning the cathodes and conveying same through the bath. A vast reduction in time required for plating would result and with mechanical devices the labor costs would be much less than is now possible with nickel solutions. Smaller sized plant would cost less for supplies and repairs.

Thirty-one cents worth of cobalt will do the plating that cost 45 or 50 cents in nickel. Buffing costs are less, buffing labor easier. The deposit is rich in appearance, easily finished to a high luster, is very tenacious and adhesive, anodes are of greater purity, have cleaner corrosion. The bath requires less attention, and has a much higher conductivity than nickel.

Read at Dayton Convention.

ANNOUNCEMENT.

In the next issue the editor will announce the policy he will pursue while in charge of the "Review."

"We" took charge and began work on this issue still dazed by the suddenness of our election and we ask you to have patience with us until we recover our "equilibrium." Needless to say that our policy will be strictly in conformity with the laws of our society, and the "Review" will be all that the publication of an educational society should be, so far as my limited abilities will permit it.

We have also appointed an assistant editor, hence we use the word "we" with authority. The name of the assistant editor will not be made public at present as she is not very keen for notoriety.

REPORT OF THE SECRETARY, AMERICAN ELECTRO-PLATERS SOCIETY FOR THE FISCAL YEAR ENDING MAY 31, 1915.

The past year has been a fairly successful one for the American Electro-Platers Society when all the factors are considered. While the industrial and economic conditions in the country have been bad since the first of last August and many of our members have been out of employment, necessitating in some cases their dropping out of the Society, the membership has shown a healthy increase. The branch society per capita returns showed a membership of 410 on June 1, 1914. During the year two new branches have been organized, Cleveland on November 19, 1914, and Toledo, on April 3, 1915. The Indianapolis Branch, which was practically out of existence from June, 1914, to April, 1915, was reorganized March 27, giving the society at the present time a total of sixteen branches and an active and associate membership of ——, an increase of membership of 22%. Under existing conditions the increase, while not as large as might have been possible with better financial and economic conditions, is fairly satisfactory.

The chief difficulty of the society during the past year has been our finances. At the 1914 convention it was decided to change the title of the official organ and to publish it monthly instead of quarterly. It was believed that the society was on a financial basis that would warrant the expenses of publication being taken care of from the revenues of the Supreme Society. This belief was based on a misconception of our total membership due to insufficient data being available. It was discovered on checking the P. C. returns that our membership was only 4/7 of the estimate that formed the basis for estimating our revenue and it became necessary to provide extra funds to finance the publication or to suspend it temporarily.

The Executive Board having the matter referred to them for action decided that the publication must be issued monthly in accordance with the will of the convention and it became necessary to increase our revenue to meet the expense. To this end it was finally decided to levy a special tax of 10% of the revenues of the branch societies based on their per capita return of June 1, 1914, as provided for in the constitution.

The amount realized from this source, along with the increased revenue due to increased membership and the strictest economy on the part of your editor, Mr. H. E. Willmore, have enabled us to continue its publication. We take this opportunity to point out, however, that this society was not, in 1914, and is not today, financially strong enough to continue the publication of the Monthly Review on its present basis. One of the most important duties of this convention will be to deter-

mine a method of financing this publication so as to remove the burden from the treasury of the Supreme Society. In order to finance this convention and to pay our promised salaries it has been necessary to request the various branches to anticipate their final payment for the fiscal year.

The educational work of the society has progressed. This has taken various forms. Some of the branches have installed laboratories for chemical experiments and research work in electro-plating.

Some of the branches have the use of chemical laboratories in colleges, universities and high schools. Others have arranged for lectures and instruction in chemistry in their meeting rooms. The St. Louis Branch has succeeded in getting the St. Louis Board of Education to add a course of chemistry especially adapted to electro-plating, to the curriculum of the public schools and which they all attend as a class.

Bureaus of Information and Employment.

The Information Bureau maintained by the society under the supervision of the secretary, has been used by the members and manufacturers during the year. Inquiries for information regarding processes and questions relating to electro-plating have been answered or referred to authorities capable of giving the desired information. This activity of the society will be of great usefulness as the society increases in numbers and prestige.

The services of the Employment Bureau have been requisitioned repeatedly during the year both by our own members and by non-members, a number of requests for foreman platers have been received from manufacturers and the trade papers have been of service to the Society by referring to the Bureau requests from concerns which would be later published in their columns. Some of our members have found positions thru its services and several new members have joined the society thru having found positions thru its use. The usefulness of the bureau will, like the Information Bureau, become a considerable factor in the growth and usefulness of the society as time progresses.

WALTER FRAINE,
Supreme Secretary.

EDITOR'S REPORT AND REVIEW OF THE YEAR'S WORK.

Mr. President and Gentlemen:

It is with a certain amount of gratification that I have to report the culmination of a year's work as editor of the Monthly Review. The past year, I think, has amply justified the existtence of the Review as a monthly, for it has demonstrated the ability of the members of the American Electro-Platers' Society to conduct a monthly journal devoted to their own interests and to live up to the standard of usefulness and high purpose which was contemplated in the founding of the organization, and undeniably, a great factor in accomplishing this result has been the Monthly Review, for it has been the means of more closely cementing the bonds of fraternity among the members and the various branches of the society.

This monthly gathering together into one focal point of the minds of the members has not only been of benefit to the individual reader of the publication, but has brought about a sense of unity between the branches throughout the country which has contributed much toward the stability of the society, and this augurs well for our future progress and development.

In many cases, the character of the papers selected for publication have been of great value and others have shown evidences of a constant striving for the truth in electro-plating matters in evident consciousness of the fact that "the truth shall make us free" of any traditions which have been retarding our progress in the past.

Let it not for a moment, however, be understood that this self congratulation implies that we have attained any great degree of perfection in our work or in the quantity of excellent matter presented, but we realize that we must creep before we can run and we are grateful that the work that we have done the past year reveals to us the fact that we are on our way to the goal we have set before us.

Of great encouragement to us should be the history of the development of the branches. During the past year we have noted successively the formation of the Bridgeport, Cleveland and Toledo branches and the reorganization of Indianapolis branch.

The Bridgeport branch has, since its inauguration, built and paid for its laboratory and has increased its membership over 40%. It has been holding a course of chemical lectures twice a month and has shown every evidence of progress.

The New York, Newark and Toronto branches have also provided themselves with chemical laboratories and the branch at St. Louis has been generously co-operated with by the Board of Education through the furnishing of a meeting place and in-

struction in chemistry.

One of the most important developments in the science of electro plating during the past several years has been brought recently to our notice as the result of the research work carried out by the Research Laboratory of Applied Electro-Chemistry and Metallurgy, School of Mining, Queen's University, Kingston, Ontario. I am referring to the researches on electro plating with cobalt as conducted by Herbert T. Kalmas, C. H. Harper and W. L. Savell and the experiments made by one of our members, Mr. W. H. Barrows, of the Russell Motor Car Co., Toronto, Canada. The experimental data furnished to the American Electro-chemical Society on cobalt plating will prove of great interest to all electro platers and doubtless have important influence on the work which we as electro platers may be confronted with in the future.

As regards the condition of the electro-plating industry during the past year since the beginning of the European conflict, there has been a considerable slackening of electro-plating work, and many of our members have been without employment for considerable periods of time. There are, however, signs of restoration and we hope that in the near future work throughout the country will be resumed in full, and that at our next meeting we can report more prosperous conditions.

An important point for our consideration, is the arrangement of our financial affairs so as to take care of the publication of the "Monthly Review" or any other form of publication we may contemplate to represent us in printed form during the coming year. The present method has not proven to be the most satisfactory, and we now have had sufficient experience in cost of printing and the method of assessment to determine the lines along which future publication and assessment therefor must be made.

H. E. WILLMORE,
Editor.

CONVENTION NOTES.

The third annual convention of the society took place at Dayton, Ohio, on June 3d, 4th and 5th and was successful in every way. More papers than could be read in the limited space of time allowed for them, were offered, and those that were read were interesting enough to provoke a spirited discussion after each reading.

Of particular note was the one read by Mr. W. S. Barrows, the new Supreme President, on Cobalt Deposition. It created considerable interest and made an impression, not only on the platers, but on several supply men who were interested auditors.

The convention was unanimous in proclaiming the National Cash Register Company a most royal host, and it went on record with a rousing vote of thanks to Mr. John M. Patterson, president of that great concern, for the hospitality and the courtesies that were shown the delegates and members by the "N. C. R."

Mr. Walter Fraine was a very busy man. He was busy from the minute that Dayton landed the convention at Chicago until the last delegate and visitor left Saturday evening, and he will continue being busy for another year, for he is going to serve us as secretary-treasurer during the coming year.

The office of treasurer was merged with that of secretary and Mr. Fraine will, in addition to doing the work of the secretary's office, look after and keep the funds of the society.

The election of officers resulted as follows:

Supreme President—W. S. Barrows, of Toronto, Ont.

Supreme First Vice-President—H. H. Williams, of St. Louis, Mo.

Supreme Second Vice-President—W. G. Stratton, of Bridgeport, Conn.

Supreme Secretary-Treasurer—Walter Fraine, Dayton, Ohio.

Editor—J. H. Hansjosten, Kokomo, Ind.

The convention of 1916 will be held in Toronto. The date will be within ten days of July 1, 1916.

It's too bad that every member of the society could not attend the convention. It would have been worth while to any one and no matter what the material cost, the benefits gained would more than repay it.

The closing event, the crowning glory, when the end came in a final burst of wisdom, cheeriness and great good humor, along with the bounteous feast that was spread by the whole-souled, hospitable members of Dayton Branch, was the banquet on Saturday evening. Gems of wit and humor in the form of "Telegrams" were received by various members and the toastmaster refused to allow any privacy, but insisted that they be read aloud.

And they were. Space and other things does not permit me to publish them, but you have my word for it that they were good.

And with all the great good fellowship, and healthy fun, the educational features were not neglected, as you may see by the articles appearing in this issue by Messrs. Barrows, Hogaboom and Proctor. Mr. Barrows' article was read Thursday evening while Mr. Hogaboom could not finish reading his, because he had to leave for his train. Mr. Fraine finished it, and the applause that followed its conclusion was just as hearty as if the brilliant author had himself read it all.

Mr. Proctor's splendid article will be new to every one when they see it in print for time sped by too swiftly to allow him to read it at the banquet. It is right to the point and—but read it yourself, and it won't be necessary for me to comment on it.

All the old, and many new faces were there. John Sterling nearly missed it, but he was welcomed all the more heartily when he did arrive.

A vote of censure should have been passed on Messrs. Fraine and Servis. Why should they suggest that we be compelled to tell our age? Neither of them are so young that all the words of Judge Baggat would pass them by without eliciting at least a little interest. And they both know just what I mean too. And yet these two gentlemen, whom so many of us had long considered friends, brazenly conspired to bring about that we, that is, all those in attendance, tell their age. And then they promptly pulled off the Suff. stunt and made themselves younger than they were. Walter insisted that he was not born until in the late 40s, while Oscar insisted he could not remember any further back than the time when the soldiers marched away to the battle of Bull Run.

But just think how hard that rule must have been on Harry Starret, Martin O'Connell and Ernie Lamoureux, to say nothing of how awful it was on Fred Liscomb and A. P. Munning. Oh, well, we're all getting along, ain't we?

And I didn't say a word about Barrows.

WHAT THE BRANCHES ARE DOING

All matters for this department must be in the hands of the editor by the 7th of the month. Anything received later than that date will be held for publication the following month. Send all communications to J. H. Hansjosten, R. R. No. 5, Kokomo, Ind. —Editor.

SUPREME SOCIETY

Meets first week in July, 1916, at Toronto, Ont. Secretary, Walter Fraine, 507 Grand Avenue, Dayton, Ohio.

NEW YORK

Metes fourth Friday of each month at Broadway Central Hotel, New York City, 8 P. M. Secretary, Joseph Minges, 148 Schenck Avenue, Brooklyn, N. Y.

The regular May meeting of the New York Branch was held Friday evening, May 28th, at their room in the Arcade Building, with President Haddow in the chair. The following officers were elected for the ensuing year:

President, Herman H. Reama; vice-president, Joseph Minges; secretary-treasurer, Wm. Fisher; recording secretary, John Painter; sergeant-at-arms, Rockey E. Massicotte; assistant sergeant-at-arms, W. B. Shanks; librarian, James A. Stremel; trustees, Thomas B. Haddow, Wm. Schneider, N. E. Dabolt, B. Popper and John Sterling.

George Gehling was given a transfer to the Newark Branch. This branch sent an exhibit to the convention in the hope of capturing the trophy. The laboratory staff are doing fine work in this branch by educating its members in the analysis of their solutions. An open meeting will be held June 11th and a demonstration on the depositions of Cobalt will be given.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Penna., 34th and Spruce Streets, Philadelphia, Pa. Secretary, Philip Uhl, 2432 North Twenty-ninth Street, Philadelphia, Pa.

The regular monthly meeting was held Friday, June 4th, President Samuel Barr in the chair and a good attendance of members. After the regular routine of business a general discussion of nickel solutions and heavy acid copper plating took place.

Elected to Membership.

Henry Kurz, 1340 Atlantic Ave., Camden, N. J.
Edward F. Homan, 419 South Fifth St., Camden, N. J.

Applicants for Membership.

Morris Metz, Box 284, Quakertown, Pa.
John R. Law, 662 E. Marshall St., Norristown, Pa.
F. R. Ahlstrand, 3654 North Eleventh St., Philadelphia, Pa.

BRIDGEPORT

Meets third Friday of each month at the office of the Brass World, 260 John Street, Bridgeport, Conn. Secretary, Nelson Barnard, 858 Howard Ave., Bridgeport, Conn.

CHICAGO

Meets fourth Saturday of each month, 8 P. M., Western Building, Randolph Street and Michigan Avenue. Secretary, H. E. Willmore, 5911 South Boulevard, Chicago, Ill.

The regular monthly meeting was held May 22d with O. E. Servis presiding and a large attendance.

The election of officers for the coming year resulted as follows: Oscar E. Servis, president; John P. Manz, vice-president; H. E. Willmore, secretary-treasurer; Chas. B. Wrout, librarian; Joseph Emmett, sergeant-at-arms; board of managers, H. A. Gilbertson, H. H. Posbeck and M. S. Herman.

The following were elected as delegates to represent Chicago Branch at the annual convention, Dayton, Ohio, June 3, 4, 5: J. H. Hansjosten, H. E. Willmore and O. E. Servis.

It was decided to hold the annual "Smoker" Saturday, July 10th. S. E. Huenerfauth, H. H. Posbeck and H. A. Gilbertson were appointed to make the necessary arrangements.

The following question was asked and discussed: "Would like information as to whether polished cast iron is harder to buff when cleaned in an electric cleaner than when it is scoured with brush and pumice stone previous to plating. Buffers say, pieces that are not electrically cleaned will buff easier, meaning that the old way of immersing in lye and then scouring before plating leaves the iron easier to buff." Some of the members contended that the abrasion caused by the pumice stone made the opposite true and that work electrically cleaned should result in much easier buffing of the work.

Application for Membership.

Gus Jelinek ----------1901 S. Western Ave., Chicago, Ill.

Change of Address.

W. G. Meggers----------3121 Washington Blvd., Chicago, Ill.

NEWARK

Meets first and third Friday of each month, 8 P. M., 47 Bank Street, Newark, N. J. Secretary, Chas. A. Stiehle, 46 West Madison Avenue, Irvington, N. J.

DETROIT

Meets first Friday of each month at Prismatic Hall, 140 First Street. Secretary, B. E. Miller, 545 Townsend Avenue, Detroit, Mich.

TORONTO

Meets fourth Thursday of each month at Occidnetal Hall, Bathurst and Queen Streets. Secretary, Ernest Coles, P. O .Box E, Coleman, Ont.

CINCINNATI

Meets once each month at Dennison Hotel, Cincinnati, Ohio. Secretary, F. H. Nordman, 720 Froom Ave., Cincinnati, Ohio.

BUFFALO

Meets first Saturday of each month at the University of Buffalo, 8 P. M. Secretary, John G. Murphy, 71 Dingens Street, Buffalo, N.Y.

ROCHESTER

Meets second and fourth Friday of each month at University of Rochester. Secretary, C. V. Haring, 603 Dewey Avenue, Rochester, N. Y.

DAYTON

Meets first and third Wednesday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Alphonz Lamoureux, 500 East First Street, Dayton, Ohio.

The June meeting of Dayton Branch was held Wednesday, June 8th, with a large and enthusiastic attendance. The principle topic of the evening was the report on the recent convention, which was received with much enthusiasm from the fact that it was a success in every way. The secretary's report for the year just passed showed the Branch to be in a good condition from every standpoint. A short discussion was held on Cobalt Plating as demonstrated by Mr. Savelle, of Deloro, Ontario, at the N. C. R. plating department. On account of being located out of the city Vice-President Gordon tendered his resignation, which was regretfully accepted and Bro. Robert Suman was unanimously elected to succeed him.

Application for active membership was received from Mr. C. F. Athy, 302½ Ludlow Ave., Springfield, Ohio.

Application for associate membership was received from Mr. H. E. Ellmore.

Change of address—Clarence Van Doran, 2922 W. Third St., Dayton.

A, LAMOUREUX, Secretary.

ST. LOUIS

Meets fourth Saturday of each month at Public Library Assembly Rooms. Secretary, H. H. Williams, 2134 Nebraska Avenue, St. Louis, Mo.

MILWAUKEE

Meets first Friday of each month at Eagles Hall, 137 Second Street. Secretary, E. C. Yaeger, 962 Ninth Street, Wilwaukee, Wis.

Milwaukee Branch gave a banquet on the evening of May 22d that was a success in every way. Speeches were made by Prof. C. T. Burgess and Mr. G. W. Bruce on the Welfare of the Society. President Daniel Wittig made an address explaining the aims and objects of the society. Mr. Arthur E. Kreut, the chemist of the

Branch, made an address urging the members to treat plating as a science, while Mr. Joseph Birbaum and Dr. O. P. Watts read papers on electro-deposition. The last two will be published in the "Review."

At the last monthly meeting the following officers were elected:

President, Daniel Wittig; vice-president, Roy Barkdoll; secretary, Ernst C. Yaeger; treasurer, Ed Wiman; labrarian, Ed Gouin; Sergeant-at-arms, Andrew Kraft; board of managers, Arthur Koehler, Robt. Stenernagel and John W. Mizenski.

CLEVELAND.

This Branch will meet the last Saturday of the month hereafter.

Elected to Membership.

Peter H. Frank, 9314 Hough Court, Cleveland, Ohio.

A. Easton, 1339 West 93d street, Cleveland, Ohio.

Our semi-monthly meeting was held May 9th and notwithstanding the inclement weather there was a fair attendance, and plans were gotten under way for establishing a laboratory with equipment.

Mr. Fehren Wadsworth was elected as treasurer of the branch.

In the future we will meet the last Saturday of each month.

TOLEDO

Meets every Wednesday at Toledo University, James C. Nagle, Secretary, 209 Navarre Ave., Toledo, Ohio.

INDIANAPOLIS

Meets last Saturday of each month at Hotel Dennison, Artes Nelson, Secretary, 1617 Shelby St., Indianapolis, Ind.

If I shoo'ed geese or peeled pertaters, or herded snakes and alligators, I'd have one settled plan—I'd say—tho' lowly be my labor, I'd do it better than my neighbor, or any other man.

I'd shoo my geese and peel my taters and herd my doggone snakes and 'gaters, so every passer-by would cry—

"Keeno, he's a peacherino: He'll do it or die."

WALT MASON.